Message

From: Moore, Jaci L [Jaci.Moore@lyondellbasell.com]
Sent: 9/11/2013 8:47:56 PM
To: chris.roling@dnr.iowa.gov; Bermel, Reid [DNR] (Reid.Bermel@dnr.iowa.gov) [Reid.Bermel@dnr.iowa.gov]; SARAH.PIZIALI@DNR.IOWA.GOV; Brian.Hutchins@dnr.iowa.gov; Peter, David [peter.david@epa.gov]; Smith, Mark [Smith.Mark@epa.gov]
CC: Evans, John R. [John.Evans@lyondellbasell.com]; Gooris, Jim [Jim.Gooris@lyondellbasell.com]; Enyeart, Christopher A. [Christopher.Enyeart@lyondellbasell.com]; Venters, Emily [Emily.Venters@lyondellbasell.com]; Cook, Steven D. [Steven.Cook@lyondellbasell.com]; Lundgren, Andrew A. [Andrew.Lundgren@lyondellbasell.com]
Subject: Project Number 13-179

1) **Routine Maintenance, Repair, Replacement (RMRR)**
Based on the current responses/information the Department would not consider this project (or group of projects) to be considered RMRR, but rather a life extension project. In order to better understand the changes that have occurred the Department has the following questions/comments:

The general turnaround projects conducted during the Clinton turnaround are typical of the routine maintenance, repair and replacement projects that are conducted continuously at the Clinton Plant. They are routine and are conducted during the turnaround simply because they require a plant shutdown in order to be accomplished safely. At the same time, three production improvement or energy efficiency projects are being implemented. Since Olefins plants are designed to operate for several years between shutdowns, these projects are being implemented during the turnaround because they require a plant shutdown in order to be accomplished safely.

- What components make up the "Olefin Unit?"

The Olefin Unit consists of tens of thousands of pieces of equipment, including valves, pumps, vessels and exchangers. To provide a meaningful answer, the Olefin Unit "components", or sections, can be described as feed preparation, pyrolysis cracking, compression, sulfur removal, purification, and fractionation. Those sections may be made up of many individual major pieces of equipment such as distillation columns, tanks, dryers, boilers, or furnaces. Those major pieces of equipment are often fitted with ancillary equipment such as temperature and pressure indicators or transmitters, valves, pumps, sight glasses, lubrication systems, inline filters and such.

- What components were replaced on the "Olefin Unit?"

None of the "components" sections or major pieces of equipment as described above were replaced during the Olefins Turnaround. A full list of the individual pieces of ancillary equipment that were replaced can be provided if necessary; however, preparation of this list will require some time.

- What components were repaired on the "Olefin Unit?"

Many pieces of ancillary equipment within the "components" described above were repaired during the Olefins Turnaround. A full list of the individual pieces of equipment that were repaired can be provided if necessary; however, preparation of this list will require some time.

- Please provide the physical percentage of unit that was repaired or replaced and not the cost percentage.

Information regarding the physical percentage of the unit that was repaired or replaced is not available.

- The Department asked about the expected lifetime of the unit and the previous reply was "As long as the unit is properly maintained and is economically feasible to operate, the unit can continue to operate." This reply does not answer the question posed by the Department. Every piece of equipment has an expected lifetime even with proper maintenance. Based on the above reply it would appear that any maintenance project is a life extension project to this unit.

No expected lifetime of the Olefins Unit has been defined.

- The annual O&M budget for the Olefin Unit is about $286 million. What is the approximate total O&M budget for the whole plant in Clinton?

The annual O&M budget for the Olefin Unit is $268 million. The total plant O&M budget is approximately $728MM.

- What is the total cost of all projects related to the General Turnaround Work?

The total cost for the projects related to IDNR project 13-179 is approximately $72MM.

2) **Calculations**

After going through the calculations I have one main comment and a couple of clarifying questions:

- According to the calculations the year 2012 was used to determine production. In that year the production was 1043 million pounds. It appears the 24 month period used for baseline actual emissions was 2011 and 2012. So why wasn't the production also based on the average of 2011 and 2012?

I have revised my calculations for project number 13-179 and have used 2011-2012 as baseline for production and all criteria pollutants. The results are summarized in the table below.

- The calculations appear to use a 35 million pound increase, but based on the RMRR questions the project will restore the Olefin Unit to its design capacity of 1089 million pounds which is a 46 million pound increase over 2012 production (1043 million pounds). In your 9/9/13 email a rate of 1170 million pounds was noted. Please explain the use of the 35 million pounds.

The use of 35 MMlbs was specific to the J102 project. Once all projects have been implemented, the design capacity of the unit will be 1170 MMlbs.

- EPA has stated that even with the use of baseline actual emissions to projected actual emissions the first step of a PSD applicability analysis looks only at emission increases. Emission decreases such as the energy efficiency improvements are only considered if it is part of a facility-wide netting analysis and then those decreases must be made creditable. To include the decreases in the step is to do "project netting" which is not allowed per PSD. I have included a memo I wrote in 2012 regarding "project netting" based on discussions with EPA Region VII. Please remove the decreases from the calculations and provide updated project tables showing only the increases in emissions.

Emissions for each project have been performed according to the method described in your memo. Emissions increases from the Equistar Olefins Plant will result from completion of three discrete capital projects and from routine plant maintenance that is associated with no physical or operation change to the facility. That maintenance is primarily cleaning of partially plugged equipment and removal of fouling on heat exchange surfaces.

Baseline emissions are the average of 2011 and 2012 activities. Presented below are emissions rates for each of the criteria pollutants plus CO2 and CH4, showing the emissions increases above baseline for each of the projects. There are no contemporaneous decreases for the projects associated with the boiler efficiencies associated with the J101 and J102 projects. Then the table shows the emissions increases resulting from cleaning of equipment, and those increases are not considered for comparison with the PSD threshold because they are not a physical or operational change.

Pollutant (TPY)	PM2.5	PM10	PM	SOX	NOX	VOC	CO	THAP	CO2	CH4
Baseline Emissions	27.31	170.55	183.11	0.85	830.60	887.95	454.88	38.27	441,136	17.98
E119/J104 Modification +32 MMlbs above Baseline	28.07	171.32	183.90	0.85	842.81	888.76	464.98	38.46	453,022	18.20
Incremental Change	0.76	0.76	0.79	0.00	12.21	0.82	10.10	0.20	11,886	0.22
Post Project 2: J102 Modification +35 MMlbs above Baseline	28.14	171.39	183.97	0.85	843.95	888.84	465.77	38.48	454,137	18.22
Incremental Change	0.83	0.84	0.87	0.00	13.35	0.89	10.89	0.21	13,001	0.24

Post Project 3: J101 Modification Energy Efficiency	Not accounted as project is an energy efficiency project.									
Sum of Incremental Changes	1.59	1.60	1.66	0.00	25.56	1.71	20.99	0.41	24,887	0.26
Post Equipment Cleaning (RRMR)	28.10	171.34	183.93	0.85	843.21	888.79	465.25	38.47	453,410	18.20
Incremental Change	0.79	0.79	0.82	0.00	12.61	0.84	10.37	0.20	12,274	0.23
Potential to Emit After T/A	29.69	172.94	185.59	0.85	868.77	890.50	486.24	38.88	478298	18.66

As shown in the table above, the project emissions increases were all well below the threshold for PSD applicability. The one closes to triggering PSD applicability, NO2, was approximately 64% of the threshold for the capital improvements. The projects individually or in combination do not trigger PSD review.

As I said above I would like to have a conference call to discuss these items. I would like to include Reid Bermel, Sarah Piziali, and Brian Hutchins so we can avoid multiple calls. Looking at our schedules here the earliest time we are all available is from 9 am – 10 am Thursday (9/12) morning. We are also available from 11 am – noon on Thursday and 1 pm – 2:30 pm on Thursday. Please let me know the best time that works for you. Also, if you are able to complete any of the above requests it would be very helpful for our discussion if you could send them in prior to the phone conversation.

I hope this response answers all of your questions satisfactorily. If not, I suggest that a meeting may be more productive than a conference call. I am available to meet with the IDNR personnel suggested at 9am or in the afternoon on Thursday, along with our a corporate support team member.

From: Moore, Jaci L
Sent: Wednesday, September 11, 2013 8:44 AM
To: Gooris, Jim; Evans, John R.; Cook, Steven D.; Lundgren, Andrew A.; Venters, Emily; Enyeart, Christopher A.
Subject: FW: Project Number 13-179

Calculations are done. Here is my reply.

From: Roling, Chris [DNR] [mailto:Chris.Roling@dnr.iowa.gov]
Sent: Tuesday, September 10, 2013 1:57 PM
To: Moore, Jaci L; Enyeart, Christopher A.
Cc: Bermel, Reid [DNR]; Piziali, Sarah [DNR]; Hutchins, Brian [DNR]; Peter, David (peter.david@epa.gov); smith.mark@epamail.epa.gov
Subject: Project Number 13-179

Jaci,

I did get your voicemail, but wanted to finish reviewing all of the documentation and put all of my questions together before calling you back. I have put my questions/comments together below and would like to set up a

time to arrange a conference call to discuss them after you have had a chance to review my questions/comments.

1) **Routine Maintenance, Repair, Replacement (RMRR)**
   Based on the current responses/information the Department would not consider this project (or group of projects) to be considered RMRR, but rather a life extension project. In order to better understand the changes that have occurred the Department has the following questions/comments:

The general turnaround projects conducted during the Clinton turnaround are typical of the routine maintenance, repair and replacement projects that are conducted continuously at the Clinton Plant. They are routine and are conducted during the turnaround simply because they require a plant shutdown in order to be accomplished safely. Olefins plants are designed to operate for several years between shutdowns.

- What components make up the "Olefin Unit?"

The Olefin Unit consists of tens of thousands of pieces of equipment, including valves, pumps, vessels and exchangers. To provide a meaningful answer, the Olefin Unit "components", or sections, can be described as feed preparation, pyrolysis cracking, compression, sulfur removal, purification, and fractionation. Those sections may be made up of many individual major pieces of equipment such as distillation columns, tanks, dryers, boilers, or furnaces. Those major pieces of equipment are often fitted with ancillary equipment such as temperature and pressure indicators or transmitters, valves, pumps, sight glasses, lubrication systems, inline filters and such.

Except for the dry gas seals on the compressors, cooling towers, furnaces, and boilers, the equipment is closed to the atmosphere and are not directly vented.

- What components were replaced on the "Olefin Unit?"

None of the "components" sections or major pieces of equipment as described above were replaced during the Olefins Turnaround. A full list of the individual pieces of ancillary equipment that were replaced can be provided if necessary; however, preparation of this list will require some time.

- What components were repaired on the "Olefin Unit?"

Many pieces of ancillary equipment within the "components" described above were repaired during the Olefins Turnaround. A full list of the individual pieces of equipment that were repaired can be provided if necessary; however, preparation of this list will require some time.

The major equipment that was modified during the outage:

- J101 process gas compressor- improvements to increase the efficiency and the extraction capabilities the steam turbine. This project reduced emissions from the boilers.
- J101A water and oil processing improvement- The water/oil level control is being replaced to restore reliable automatic liquid level control in the suction drums for the compressor. There were no changes in production or emissions as a result of this project.
- E119 distillation tower and J104 ethylene compressor- new trays were installed in the tower and the steam turbine on the refrigeration compressor that services the tower was modified to provide additional power to the compressor. The project also included installation of a new heat exchanger. The purpose of this project was for production increases.
- J102 Propylene refrigeration compressor- the turbine and compressor will be undergoing significant work that will increase the equipment's efficiency. The project will result in production increases.
- J104 and J101A check valve failure mitigation- replace the check valve mechanisms on J104 and J101A to reduce probability of plant failure. There were no changes in production or emissions as a result of this project.

New equipment being installed:

- One heat exchanger as part of the J104 turbine upgrade and the E119 distillation tower project.
- Flanges and block valves on approximately 270 relief valves. (RV mitigation project)

- Please provide the physical percentage of unit that was repaired or replaced and not the cost percentage.

Information regarding the physical percentage of the unit that was repaired or replaced is not available.

- The Department asked about the expected lifetime of the unit and the previous reply was "As long as the unit is properly maintained and is economically feasible to operate, the unit can continue to operate." This reply does not answer the question posed by the Department. Every piece of equipment has an expected lifetime even with proper maintenance. Based on the above reply it would appear that any maintenance project is a life extension project to this unit.

No expected lifetime of the Olefins Unit has been defined.

- The annual O&M budget for the Olefin Unit is about $268 million. What is the approximate total O&M budget for the whole plant in Clinton?

The total plant O&M budget is approximately $728MM. This includes polymers raw materials, chemicals, catalysts and additives that are at a profit center level.

- What is the total cost of all projects related to the General Turnaround Work?

The total cost associated with the capital projects and the general TA is approximately $90MM.

Each individual capital project that was performed during the TA must be considered individually. Although they were executed at the same time, each project is independent of one another. More than 69% of the costs are related to labor, site preparation, and logistics. The cost for physical equipment and parts was less than 31% of the turnaround cost.

- E-119 Retray, J104 Turbine Capacity Increase, and heat exchanger installation: $2,908M
- J101 Turbine Upgrade: $1,900MM
- J102 Energy Reduction: $7,019M

Projects with no production increases:

- RV Mitigation Project: $7,725M
- J-104 check valve failure mitigation: $535M
- J101A Water and Oil Processing Improvement: $772M
- J-101A check valve failure mitigation: $391M

The total cost for the general TA work is $60MM. The costs associated with TA include the costs of freight, nuts, bolts, gaskets, fabrication, blast and paint, insulation, hangers, supports, scaffold, etc. On top of that are the TA support costs which include things like cranes; operators and riggers; safety personnel; personal protection equipment and supplies; logistics needs-trash pickup, water delivery, equipment rental; labor costs premiums; operational costs to shut down and prepare the unit for the maintenance work; unit decon; waste disposal; nitrogen supplies for effectively purging the equipment. The costs associated with the work that is being performed is as follows:

- Installation of modified control valves ~$1,612 M
- Vessel Cleaning ~$1,306 M
- Piping modifications ~$1,398 M
- Valve replacement ~$2,264 M

2) **Calculations**

After going through the calculations I have one main comment and a couple of clarifying questions:

- According to the calculations the year 2012 was used to determine production. In that year the production was 1043 million pounds. It appears the 24 month period used for baseline actual emissions was 2011 and 2012. So why wasn't the production also based on the average of 2011 and 2012?

I have revised my calculations and have used 2011-2012 emissions as baseline. To project potential emissions, I used data from 2012. This is because the furnaces and the boilers are interrelated. The furnaces help to create steam which in turns reduces the needs of the boilers.

- The calculations appear to use a 35 million pound increase, but based on the RMRR questions the project will restore the Olefin Unit to its design capacity of 1089 million pounds which is a 46 million pound increase over 2012 production (1043 million pounds). In your 9/9/13 email a rate of 1170 million pounds was noted. Please explain the use of the 35 million pounds.

There are three separate production increasing projects that are being implemented during the TA. These are:

- J104/E119 project estimates an increase of 31 MMlbs.
- J102 compressor estimates 35 MMlbs
- Unit cleaning/General TA work estimates 14 MMlbs.

The use of 35 MMlbs was specific to the J102 project. The total change in design capacity of the unit after each separate project has been implemented is 81 MMlbs. The current design rate of 1089 MMlbs will increase to 1170 MMlbs once projects are completed. Throughputs were based on the ratio of (design rate + increase)/(2012 production)

- EPA has stated that even with the use of baseline actual emissions to projected actual emissions the first step of a PSD applicability analysis looks only at emission increases. Emission decreases such as the energy efficiency improvements are only considered if it is part of a facility-wide netting analysis and then those decreases must be made creditable. To include the decreases in the step is to do "project netting" which is not allowed per PSD. I have included a memo I wrote in 2012 regarding "project netting" based on discussions with EPA Region VII. Please remove the decreases from the calculations and provide updated project tables showing only the increases in emissions.

Emissions for each project have been performed neglecting energy efficiency improvements from the boiler. The tables below summarize the calculations (file has been attached):

J104/E119 project estimates an increase of 31 MMlbs with Production Potential after project equal to 1121 MMlbs

Pollutant	Projected Emissions	Change in Emissions from Baseline
PM2.5	28.73	2.00
PM10	172.52	2.83
TSP	185.51	2.83
SOX	0.99	0.02
NOX	846.79	34.39
VOC	396.58	17.96
CO	471.61	37.62
Total HAPs	33.63	1.37
CO2	4.69E+05	34168.57
CH4	12.98	0.81

J102 compressor estimates production increases to be 35 MMlbs with a production potential equal to 1124 MMlbs

Pollutant	Projected Emissions	Change in Emissions from Baseline
PM2.5	28.60	2.06
PM10	172.39	2.89
TSP	185.38	2.89
SOX	0.99	0.02
NOX	792.56	35.36
VOC	396.07	18.04
CO	463.23	38.27
Total HAPs	32.63	1.39
CO2	4.66E+05	35086.39
CH4	12.72	0.82

General TA Work estimate production increase of 14 MMlbs with a production potential equal to 1103 MMlbs

Pollutant	Projected Emissions	Change in Emissions from Baseline
PM2.5	28.30	1.65
PM10	172.09	2.48
TSP	185.08	2.48
SOX	0.99	0.02
NOX	839.79	28.65
VOC	396.01	17.46
CO	466.78	33.78
Total HAPs	33.52	1.28
CO2	4.62E+05	28739.83
CH4	12.85	0.71

J101 compressor work estimate production of 0 MMlbs with a potential production potential equal to 1089 MMlbs

Pollutant	Projected Emissions	Change in Emissions from Baseline
PM2.5	27.85	1.38
PM10	171.64	2.21
TSP	184.63	2.21
SOX	0.99	0.02
NOX	805.09	24.18
VOC	395.26	17.07
CO	458.18	30.78
Total HAPs	32.89	1.21
CO2	4.55E+05	24517.48
CH4	12.61	0.63

As I said above I would like to have a conference call to discuss these items. I would like to include Reid Bermel, Sarah Piziali, and Brian Hutchins so we can avoid multiple calls. Looking at our schedules here the earliest time we are all available is from 9 am – 10 am Thursday (9/12) morning. We are also available from 11 am – noon on Thursday and 1 pm – 2:30 pm on Thursday. Please let me know the best time that works for you. Also, if you are able to complete any of the above requests it would be very helpful for our discussion if you could send them in prior to the phone conversation.

Please schedule a meeting at 9am on Thursday. We would like to have a face to face meeting to go over this information so that we do not delay the issuance of the variance.

Please let me know if you have any questions.

Chris

CHRISTOPHER A. ROLING, PE Environmental Engineer Senior

Iowa Department of Natural Resources

P 515.242.6002 | F 515.242.5094 | chris.roling@dnr.iowa.gov

Air Quality Bureau | 7900 Hickman Rd., Ste. 1 | Windsor Heights, IA 50324

www.IowaCleanAir.gov | Air Construction Permit Hotline 877.247.4692

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